

Zero Retries issue 0153 2024-05-24

Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication, with ~~1600+~~ 1700+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Web version of this issue - <https://www.zeroretries.org/p/zero-retries-0153>

Request To Send

Commentary by Editor Steve Stroh N8GNJ

1700+ Subscribers!

In Zero Retries 0150, a mere three issues / weeks ago, Zero Retries achieved 1600+ subscribers. It's rare that new subscribers tell me where they heard about Zero Retries, and Substack only parses out a small number that came from other Amateur Radio newsletters on Substack. Thus I don't really know where this wave of new subscribers came from.

Welcome, new subscribers, to Zero Retries!

Paid Subscribers Update

My thanks to Joe Hamelin W7COM for becoming a Paid Subscriber to Zero Retries this past week! W7COM shared this message with his paid subscription:

Good Geekness

Financial support is a real vote of confidence for continuing to publish Zero Retries.

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Major Conference Countdowns

- [HAM RADIO 2024](#) in Friedrichshafen, Germany on 2024-06-28 thru 30, in 02 weeks!
- [JARL Ham Fair 2024](#) in Tokyo, Japan on 2024-08-24 and 25, in 13 weeks!

See other events at the Zero Retries Guide to Zero Retries Interesting Conferences.

SEA-PAC 2024



SEA-PAC 2024 pin designed by Adam Lea KC7NKP. Image courtesy of SEA-PAC.

Zero Retries will be attending [SEA-PAC 2024](#) in Seaside, Oregon, USA on Saturday June 1st and Sunday June 2nd, 2024. There will be a Zero Retries booth, as well as having a table in the flea market to cleanout some of the excess ephemera from N8GNJ Labs. We will also have a bit of Zero Retries collectible items, so if you are a Zero Retries fan, come early. We'll also have *lots* of [DLARC](#) stickers! (Zero Retries stickers are still in development.)

Update on *Let's Get Some More Manuals Scanned*

In Zero Retries 0152, I asked Zero Retries readers to contribute to a project to get more electronics manuals scanned for Internet Archive. I'm happy to report that more than \$600 was raised after that appeal.

Hamvention 2024 - Not Much Zero Retries Interesting

I don't have anything substantive to add to the mentions in Zero Retries 0152 about some Zero Retries Interesting-ish announcements at Hamvention 2024. If you Zero Retries readers saw something I missed, please let us all know in the comments.

The most Zero Retries Interesting item I learned of was the ComJoT CJ-1 "Android portable radio". See the article below for more detail.

Kudos to Cale Mooth K4HCK of [Amateur Radio Daily](#) for capturing some brief audio interviews with Zero Retries Interesting exhibitors at Hamvention 2024, including [HamSCI](#), [Photon Radio](#), [Libre Space Foundation SatNOGS](#), [AMSAT CubeSatSim](#), and [AREDN](#). I really liked K4HCK's

technique - quick, audio-only interviews, made available within a few days of being recorded (a few were posted the same day). Noted for future events that I attend!

73,

Steve N8GNJ

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FlexRadio 8000 Series HF Radios - Even More Capable... *Except for FreeDV*

By Steve Stroh N8GNJ

Kudos to the FreeDV team for implementing FreeDV via their clever ezDV dongle... and raspberries to FlexRadio for requiring that method for FreeDV to be available on these “more powerful” FlexRadio products.

Since the announcement of a new line of highest-end HF radios on Friday 2024-05-17, FlexRadio has posted some information about this new product line. The highest-end unit is the [FLEX-8600M](#). Obviously this product line is newer and more powerful, with more potential for future upgrades with a more powerful processor and larger Field Programmable Gate Array (FPGA). But... (not being a contester or DXer), the improvements offered in the 8000 product line are lost on me. If you're curious, YouTubers Kyle Krieg AA0Z of [Kyle - AA0Z](#) and Jason Johnston KC5HWB of [Ham Radio 2.0](#) scored 1:1 interviews with FlexRadio's Mike Walker VA3MW, and both of them sounded impressed.

But one *lack of a feature* in the FlexRadio 8000 product line really stood out to me... *no inclusion of the FreeDV digital voice mode as a standard feature.*

To be fair... all of the other “big” Amateur Radio HF radio manufacturers - Alinco, Elecraft, Icom, Kenwood, and Yaesu join FlexRadio in not supporting FreeDV without an outboard dongle. But those others didn't boast of doubling processing power and quadrupling the size of the FPGA in a new “SDR” HF radio design in 2024.

I think the dichotomy of the potential of Software Defined Radio... and the reality of what manufacturers choose to do with the potential capabilities of Software Defined Radio technology was illustrated perfectly in these two developments at Hamvention 2024:

- Announcement of the FlexRadio 8000 series by FlexRadio
- Announcement of the [ezDV](#) Adapter by TAPR and the FreeDV team

ezDV is a handheld hardware device that allows easy use of FreeDV, whether on the go or at home. Powered by an ESP32-S3 microcontroller, its built-in Wi-Fi support allows completely wireless setup (with supported radios) along with enabling more modern functionality such as FreeDV Reporter reporting and wireless firmware updates.

So... on the one hand, FlexRadio debuts a much more capable line of HF radios, with even more processor power and an even larger FPGA. But, despite all that “power”, the one thing that these

radios apparently can't do... is to operate the FreeDV digital voice mode.

Enter the ezDV which is the FreeDV mode implemented in a small dongle (with the not very powerful ESP32-S3 processor). The ezDV can connect to current FlexRadio units via Wi-Fi, which then allows a FlexRadio unit, apparently including the 8000 series, to *then* operate FreeDV.

Keep in mind that there's nothing in FreeDV that's dependent on specific hardware. FreeDV is open source [software](#) and there's ample support available for implementing it into any software defined radio platform that has sufficient processing power.

Candidly... if I worked for FlexRadio... I would treat the requirement of an ezDV to operate FreeDV on current generation FlexRadio units *as an embarrassment*. A team of part-time developers were able to implement FreeDV... but FlexRadio (with native access to vastly more capable processing power of the current generation FlexRadio units) couldn't... or perhaps more damning... *wouldn't* implement FreeDV as a native mode.

I say *wouldn't*, because a previous version of FlexRadio's SmartSDR software [could install FreeDV](#), to be able to run it *on* the radio.

No matter what the "advanced features" of the FlexRadio 8000 series, the lack of FreeDV as a native feature in SmartOS, is (in my mind) a significant failing on the part of FlexRadio. That FlexRadio can't, or won't, implement such a fundamental (in the mid 2020s) new mode says to me that FlexRadio is focused on the past of Amateur Radio:

Emission Modes - USB, LSB, CW, RTTY, AM, Synchronous AM, FM, NFM, DFM

RTTY isn't quite a century old; but the rest of those modes are more than a century old.

Instead of adding a new mode that was created within the 21st century and is "native digital" (could only be implemented in a digital radio), FlexRadio has chosen to add "[dancing on the head of a pin](#)" features, rather than a feature that reflects advanced capabilities of Amateur Radio, such as FreeDV's [amazing robustness in the presence of noise and interference](#). In my opinion, such decisions by FlexRadio pretty much negate the potential of Software Defined Radio in the FlexRadio product line.

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Connect Systems Versus DVSI

By Steve Stroh N8GNJ

Unfortunately, the Connect Systems newsletter(s) are only available via email - there's no web version. Thus this recent newsletter is "reprinted" here in its entirety for the Zero Retries readership, and perpetuity of the Zero Retries web version.

This particular CS newsletter is Zero Retries Interesting because it illustrates the challenges of Amateur Radio manufacturers in the era of a dominant technology vendor who can exert overpowering influence on radio systems. Or can they? See commentary after the CS article.

Connect Systems - Blog of the M17 Project - 2024-05-18

To the furtherance of the M17 project, I want to add D-STAR to the CS7000 M17 PLUS radio. The basic work has already been done in the MMDVM. The only real issue is the Vocoder. While there are some D-STAR vocoders, none of them is as good as what DVSI sells.

The D-STAR vocoder was first used in the ICOM D-STAR radios over 20 years ago. That means that the underlying patents are now expired. However, that does not mean the Copyright has expired because Copyrights are now good for about 99 years thanks the Micky Mouse and Disney.

To get around Copyrights with a Vocoder, you take the patents and write from scratch the code to make the D-STAR vocoder. As long as you did not copy the vocoder made by DVSI, you are clear. However, by writing the new code, you might now be infringing on some new patent of DVSI or some other company.

The get around the potential patent and copyright issue, I made an offer to DVSI. For every CS7000 M17 and CS7000 M17 PLUS radio we sold, I would give them a \$2.00 royalty against them making a claim that the D-STAR vocoder in the radio infringed against their patents or copyrights. This is in addition to the royalty they already get for the AMBE II Vocoder we use to support the DMR features. We were not asking them for the firmware of their D-STAR vocoder.

The royalty concept was [completely] rejected. If I want to use the D-STAR vocoder, I need to pay them an up-front fee of about \$350,000 plus royalty for every radio I sell. My alternative was to buy their AMBE 3000 series chip for \$22.

For a company that is going to sell between a hundred thousand radios and a million radios like Motorola and ICOM, that up-front fee is no big deal. For a smaller company, that up-front fee is outrageous.

While that \$22 fee for the AMBE 3000 chip is acceptable, it puts us at a significant technical disadvantage compared to the larger companies. The first problem is the AMBE 3000 chip takes a significant amount of power which means the battery life will be significantly less compared to the larger companies. The second issue is the AMBE chip takes room on the PCB which means my radio will now be larger compared to the larger companies.

In my opinion DVSI is in violation of the Sherman Anti-Trust laws. Because of their policies, it is not possible for a smaller company to compete against the larger companies as described above. However, to fight them, would cost more in legal fees than their outrageous up-front fees.

My suggestion for the Amateur community is to make the best vocoder you can and if DVSI then says you are breaking their patents, ask which one so you can then fix the problem. If they complain about copyright infringement, ask how they can be in violation of their copyrights if they have not released their code to copy. If you reverse engineered their code, go out of your way so you are not infringing.

Here is an interesting question. If I bought a AMBE 3000 series chip and put it in the radio but did not hook it up and then I duplicated their code and ran it in the radio, would I be infringing on DVSI intellectual property?

My thanks to friend of Zero Retries Steve Lampereur KB9MWR for an extended email and phone discussion about this topic, which greatly helped me frame what follows.

I understand Connect Systems wanting to make the best possible, “most features” radio that it can. Clearly a portable radio that can do FM, DMR, M17, *and D-Star* would be more interesting and offer more value than a radio *that couldn't do D-Star*.

But the above situation illustrates *perfectly* why M17 (and its underlying CODEC - [Codec 2](#)) was developed as an open source technology in the first place. It's open source, thus no patent fees, no royalty fees, no intellectual property, copyright, or other such encumbrances.

That is the point of open source technology!

That's not to say that using open source technology is cheap to implement, or easy to implement, or mature, or robust, or any other guarantees.

But when you use open source technology, you're a lot less likely to have a company quietly suggest “Nice little digital voice radio business you have there... would be a shame if all your profits, and more, had to be used for a legal defense against a patent lawsuit.”

Unfortunately, given the size of the Amateur Radio market, I don't see any reason why DVSI would have any incentive to “play nice” with Connect Systems and offer a reasonable deal such as what Connect Systems proposes. In fact, there's a disadvantage to do. If DVSI gave Connect Systems a reasonable (for Amateur Radio) deal, then Motorola and other big radio manufacturers could demand (with some clout) that DVSI offer *them* the same good deal that Connect Systems got.

If DVSI is ever challenged about their stance towards a small Amateur Radio manufacturer, they can point out that “it only costs \$22 per radio / chip to incorporate our superior, proven, industry-standard digital voice technology”.

The failing in Amateur Radio digital voice *isn't that we don't have a free or cheap version of DVSI / AMBE digital voice CODEC chips...* it's that Amateur Radio manufacturers haven't offered... *and Amateur Radio Operators haven't demanded **the use of Codec 2 digital voice***.

Amateur Radio has an elegant way to simply work around “the DVSI / AMBE issue” - use M17 (and within M17, Codec 2). It's not widely recognized yet¹, but M17 is now (finally) a viable digital voice system for Amateur Radio that's truly an alternative to DMR, SF, SF, P25, etc. There's even “data” in there (I'm told, but I'm still teasing that out).

BUT, and it's a huge, enormous, perhaps insurmountable **BUT...** The big Amateur Radio manufacturers *want to ignore the existence of Codec 2, M17, and FreeDV* because they feel they'll make more money (and less cost in overhead, engineering, customer support hassle) by continuing the previous paradigm of using DVSI's AMBE CODEC chips, for which they can “peanut butter” the costs into their (more profitable) commercial radio product lines.

Hedging Bets by Including D-Star?

I understand why Connect Systems wants to “hedge its bets” on their upcoming M17 radio by trying to include D-Star, but I think that's a bad choice beyond the issues CS has encountered in dealing with DVSI. Some issues I see² in attempting to incorporate D-Star in Connect Systems M17 radios:

- The primary (most enthusiastic) market for D-Star radios is in Japan, and my impression is that

Connect Systems (Amateur Radio) markets mostly into the US Amateur Radio market.

- From my (admittedly imperfect / incomplete) observations, I don't see any momentum in D-Star in this era. I'm not hearing about enthusiastic new D-Star users (D-Star radios remain "Hmm... really gotta *think* about this" expensive), nor any new D-Star repeaters going on the air. Yes, there *are* a lot of D-Star repeaters, and D-Star radios out there, but that was (again, from my impressions) mostly from the initial wave of excitement two decades ago now for D-Star the first digital voice system that was designed for Amateur Radio. From my observations, the majority of the energy and momentum for Amateur Radio digital voice has shifted to DMR³.
- D-Star capability *isn't needed* for this radio to sell; D-Star capability won't be a differentiating factor like M17 capability will be. If one wants to buy a radio with M17 built-in, Connect Systems is currently the only vendor (that will be) offering such a product. If one wants D-Star capability in a portable radio, Icom and Kenwood offer that capability now, in more mature, supported products.
- Despite Icom being an early advocate of the open source [D-RATS software](#) for D-Star radios, D-RATS has essentially been deprecated (if I understand the situation correctly) because of its use of Python 2 and that being deprecated in favor of Python 3. If Icom was really interested in promoting D-Star, it would have allocated some funding for professional developers to update D-RATS to be usable with more modern computer operating systems (port it to Python 3). That Icom has not, to date, done so, speaks to its waning support for D-Star.
- Trying to add D-Star to the Connect Systems M17 radios adds complexity to the radio, beyond the DVSI / AMBE chipset issues that Connect Systems has encountered. Can the radio support easy, mixed-mode FM / DMR / M17 and *D-Star*? Connect Systems' M17 radios already include backwards compatibility with DMR and FM - I think that can be considered "good enough" backwards compatibility.

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Impressions of the ComJoT CJ-1 Android Portable Radio

By Steve Stroh N8GNJ

Last moment update - I reached out to ComJoT to perhaps arrange a post-article interview and "Joe" of ComJoT Sales was very responsive, and quickly updated the CJ-1 web page to include a prominent mention of the "audio passthrough" capability of the CJ-1. I hope to do an interview with ComJoT about the CJ-1 in a future issue of Zero Retries. Unfortunately, time didn't permit a rewrite of the article, and I didn't want to postpone it given that the CJ-1 was the most Zero Retries Interesting development from Hamvention 2024.

...

A few observations about this new portable "Amateur Radio" unit solely from information provided by the manufacturer. TL:DR - I'm intrigued.

The world's first Open Source Dual Band Android Amateur Radio!

No need to have an Android Radio with Old, Legacy Operating System

CJ-1 is running Android 14 and has AES256 Encryption

DMR Tier 1 and 2 + FM Analog (136-174MHz, 400-480MHz)

It quickly becomes apparent that while Amateur Radio is *a* market for the CJ-1, it's not ComJoT's primary market. The primary clue is the price - \$999. Another is mentions of this radio appealing to "amateur radio aficionados" and "amateur radio enthusiasts". Yet another is prominent mention of its AES 256 encryption capability, which of course is not allowed on Amateur Radio.

But there's a lot to like on this unit. Like previous "Android phone with a radio grafted on" units, the CJ-1 is primarily an Android mobile phone so there's an always-on (as long as you're within cellular range with the bill paid up) Internet connection. With always-on Internet, there is live access to [RepeaterBook](#) and [RFinder](#) repeater lookup.

In looking at the RFinder page...their implementation of "Android phone with radio grafted on" looks very similar to the CJ-1 with a few cosmetic differences. It seems likely that both units are made by the same radio manufacturer.

The radio side is similarly conventional:

DMR Tier 1 and 2 + FM Analog (136-174MHz, 400-480MHz)

Power Output VHF: 5W/1W, UHF: 4W/1W

Though it's not mentioned on the [CJ-1 product page](#) or the [CJ-1 brochure](#) (mentioned in passing on a Hamvention 2024 walkthrough video on YouTube), a key differentiation of the CJ-1 from other "Android phone with a radio grafted on" units is that the audio path is *two-way* between the Android subsystem and the radio subsystem.

Previous implementations of "Android phone with a radio grafted on" units were limited to an Android app for controlling the radio, and the lookup features. (You couldn't really run Android software on the radio subsystem.) The two-way audio path means that data modes such as packet radio and APRS could "easily" be implemented in an Android app on the CJ-1 and used on Amateur Radio.

ComJot seems to equate Android with "Open Source" with statements like:

The ComJoT CJ-1, dubbed as the first Open Source Android Amateur Radio, is a feature-packed device that marries traditional communication methods with modern technology.

Open Source Advantage Being open source, the ComJoT CJ-1 encourages innovation and customization, allowing users to adapt the device to their specific needs and preferences.

At least there's no mention of a ComJot Android store, so it seems likely that user-developed Android apps can be loaded onto the unit via Internet, micro SD card, or USB-C.

The \$999 price of the CJ-1 can quickly be rationalized by an extensive set of additional features that, with clever software, could be taken advantage of in a portable Amateur Radio unit:

- "Octa-core" 2 GHz CPU

- MicroSD card slot (though they use the older terminology of “TF” card).
- 4” color display with touch screen.
- Camera (Front and Rear).
- Wi-Fi (both 2.4 GHz and 5.8 GHz).
- Bluetooth (Low Energy 5.0 - reasonably current).
- Overall, pretty rugged.
- 3 Ah battery.
- USB-C charging and data.

Despite some overzealous marketing phraseology such as

The Android interface makes it familiar to younger, tech-savvy generations, while its amateur radio features appeal to traditional radio enthusiasts, fostering cross-generational communication, learning and excitement about Amateur Radio.

And a few unexplained issues (there’s a “flat contact” external Speaker / Microphone connector on the right side of the radio, but no mention of such an accessory being available)...

As I looked into this unit more and more, it kind of grew on me. Granted, I’ve never seen one, let alone actually used one so I have no idea if this radio is well-developed, or not. But the CJ-1 seems to have more potential for Zero Retries Interesting applications than the \$749 Kenwood TH-D75A. Just one example (imaginary) application could be a smart APRS digipeater (implemented in an Android app) that could be remotely controlled and powered indefinitely via the USB-C port and a big USB-C power bank.

One appealing factor of the CJ-1 for me is that it’s big and rugged instead of small and petite. There are only a few physical buttons, and the rest of the controls are via touch screen, thus all functions could be reasonably discoverable in the graphical user interface, a welcome change from inscrutable multifunction keys requiring carrying a mini manual (or a PDF on another device). It also has a large capacity (and swappable) battery.

I wish ComJoT well with the CJ-1 and I plan to reach out to them and ask to be notified about Amateur Radio applications as they are developed.

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

[Mostly DIY RF New Products Announced](#)

Todd Carney K7TFC announced a number of new proudly “Hardware for Hardware-Defined Amateur Radio” products in his Spring 2024 newsletter, including:

- Bidirectional PG-TIA IF Amplifier
- GPAA-1 General-Purpose Audio Amp
- Dual-Gate J310 JFET

and a number of others. I highlight DIY RF here in Zero Retries because I’m in awe of K7TFC and other “solo” Amateur Radio hardware vendors who keep Amateur Radio *interesting and exciting* by offering unique products, no matter how mundane.

What is Mostly DIY RF, Anyway?

That really should be a “who” and not a “what” question. **Mostly DIY RF** is just a trade name for me, **Todd Carney, K7TFC**. I'm a garden-variety amateur-radio enthusiast, and I don't mind admitting I'm also an amateur at manufacturing and business as well. Naturally, I try to do my best at all three, but nevertheless as a true amateur (from the Latin *amare*: to love; doing something for the love of it).

As a business, **MDRF** is the smallest possible: it's just me, **K7TFC**. There's no other workers or employees, and there's certainly no other investors or sources of capital. The good side of this is that I don't have to answer to anyone else, nor do I need to meet their expectations of profit or capital gains. I can offer products to fellow amateurs that no properly-capitalized company would ever bother with, and I can do so at prices that are lower than what a high-overhead firm could get away with. In fact, *my* business overhead is the same one I live under, and though I do have some dedicated space for **MDRF** work, my kitchen table has been pressed into service more than once.

[Bluetooth Low Energy \(BLE\) KISS TNC Specification](#)

This was mentioned in a support exchange of emails regarding the [Island Magic B. B. Link Adapter](#) by Georges Auberger WH6AZ:

The B.B. Link adapter solves one problem: exposing the built-in TNC packet modem from the Kenwood TH-D74/5 radios to devices that can not use the Bluetooth Classic serial profile to access it. It does this by bridging Bluetooth Classic protocol to the Bluetooth Low Energy protocol and exposes it following the [BLE KISS TNC specification](#).

I’m continually impressed that Amateur Radio generates bits of hard-won wisdom such as **Specification for KISS over BLE (Bluetooth Low Energy)**, documented reasonably, that others can build upon. And that Amateur Radio generates small, focused, but critical devices such as the B. B. Link.

I’ll guess that Mike Chepponis K3MC and Phil Karn KA9Q would not have imagined that their [KISS Protocol](#) (which I remember being described at the time of its creation as a “quick hack” to use existing AX.25 TNCs for TCP/IP) would become so integral to Amateur Radio data communications.

Not only is KISS in regular use in all manner of Amateur Radio systems, it's continually being expanded into *new* systems and devices such as the Kenwood TH-D75A portable radio and the B. B. Link *nearly four decades later*. Not bad for a "quick hack".

The Radio Today guide to the Icom IC-905

Andrew Barron ZL3DW mentioned his new book on the [IC-905 mailing list](#) (must be a subscriber to view):

hi everyone, I am pleased to announce that my new book, The Radio Today guide to the Icom IC-905 is now available from the RSGB bookshop and Amazon in print and Kindle versions. <https://www.amazon.com/dp/B0D1N6H5J5>

Some of you will be familiar with my other books, see <https://www.qsl.net/zl3dw/Books.html>

I extended the first few chapters to discuss the benefits and challenges of the radio. So, if you are still deciding about buying an IC-905, they may help you make the decision. If you already have the radio, there are plenty of tips about using it. I didn't buy the 10 GHz transverter, find out why!

Here is a note from the website.

The IC-905 is a great radio and definitely worth considering if you are interested in the microwave bands. The longer I used it the more I liked it. Some say that it is expensive, but there are many things to consider, such as the price of buying a different radio, plus transverters, plus a GPS disciplined reference oscillator. The IC-905 covers the complete band not just the single frequency of some transverters, and it is far easier to configure. You even get D-Star, cross-band operation, and video (to another IC-905).

The book has a longer introduction than usual to help you decide if the radio is a good option for you. I have discussed how you can use the rig, and the positives and negatives for using it for the QO-100 satellite, or DX.

73 and GD microwave DX,
Andrew ZL3DW

A new paradigm radio such as the [Icom IC-905](#) "microwave" radio really deserves a book-length treatment from an independent perspective - kudos to ZL3DW for doing so. Even if you have no interest in buying an IC-905 (it's too expensive, you're already all set up for microwave), I think this book would still be an interesting read just to understand Icom's choices and tradeoffs in creating such a radio.

RADAE - Radio Autoencoder; Machine Learning Applied to HF Digital Voice

David Rowe VK5DGR:

Given the encouraging results with RADAE, we've pivoted our ARDC project plan to focus on RADAE, and have paused development of Codec 2 and FreeDV modes.

RADAE appears to be our strongest candidate for satisfying the top three goals we set for ourselves when applying for the ARDC grant:

1. Improve speech quality to a level comparable to commercial codecs.
2. Develop a “rag chew” FreeDV mode with subjective speech quality comparable to SSB at high SNRs.
3. Improve low SNR operation such that FreeDV is superior to SSB over poor HF channels.

We are on track to meet (and indeed exceed) the first two goals, but I think the final goal has yet to be demonstrated (e.g. SSB and the current incarnation of RADAE fall over at roughly the same SNR). There are a few bugs and many practical issues to work through before we have a real world version of RADAE that anyone can use. Plus there will be a few “gotchas” we haven’t thought of yet. Plenty for me to do in the coming months!

What blows me away about this work is that it’s mentioned in passing like it’s “business as usual technical development”. But unlike a lot of machine learning, this development (seems to be) done at “Amateur Radio scale” - with conventional desktop computers and embedded computers, not some desktop supercomputer or online server farm.

Read the whole article (and a [previous mention from 2024-03](#)) to get an idea of just how cool this is, including sample audio clips. This is yet another example of *unique technological innovation in Amateur Radio!*

[All-In-One-Cable \(AIOC\) Units Available for Sale](#)

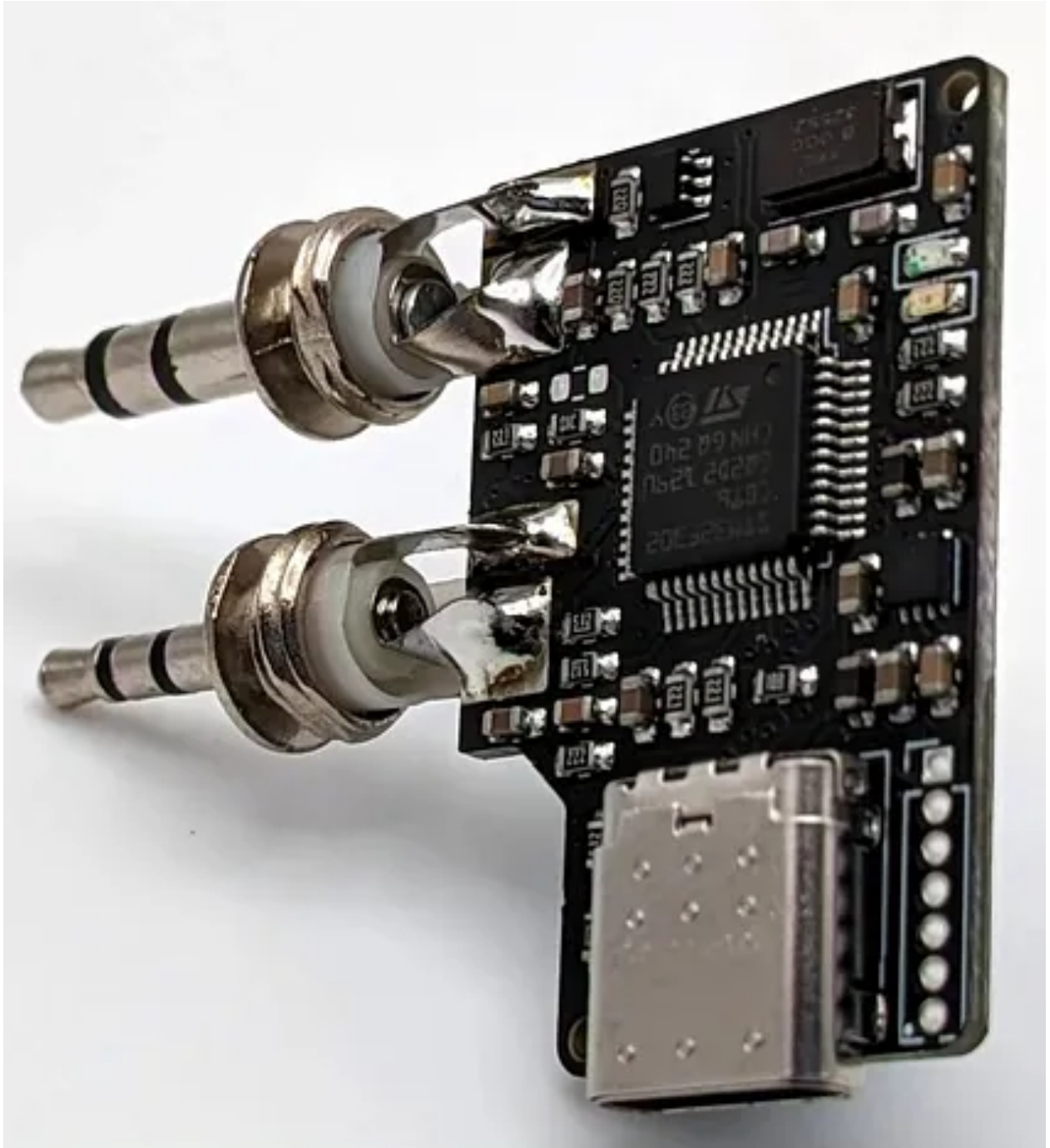
[AIOC GitHub page:](#)

The AIOC is a small adapter with a USB-C connector that enumerates itself as a sound-card (e.g. for APRS purposes), a virtual tty ("COM Port") for programming and asserting the PTT (Push-To-Talk) as well as a CM108 compatible HID endpoint for CM108-style PTT (new in firmware version 1.2.0).

The above description “buries the lede” a bit about how cool this idea really is, but the concept is quickly explained in the photos. An AIOC is a “dongle” that plugs into many portable radios instead of requiring a dedicated programming cable, and a (different) dedicated audio interface. In short, it’s an elegant solution for using portable radios for data communications, and (more easily than programming from the front panel) getting them programmed for use with multiple repeaters, etc. It’s also refreshing that AIOC uses USB-C which is now *the standard USB* connection in 2024 and beyond.

But when I last mentioned AIOC in Zero Retries 0090, AIOC was a project.

Now AIOC is available as a very reasonably priced *product* available from the [NA6D web store:](#)



NA6D AIOC - Image courtesy of NA6D.com

NA6D also offers a nice for its AIOC printed circuit board, which makes for a nice, complete-looking unit. Kudos to Nigel Armstrong NA6D for this “nice bit of kit”. I’m going to have to verify that the AIOC supports a couple of my favorite portable radios, and if that’s the case, get one or two on order.

[AMSAT Argentina to Launch *Transponder Balloon*](#)

AMSAT-UK - 2024-05-22:

On May 26, at 1300 GMT AMSAT-LU plans (weather permitting) to launch a balloon carrying a linear multimode transponder V➤U, CW, SSB, FM, APRS LU7AA-11 and VIDEO.

It could last 9 hours if it reaches 82,000 feet height landing in Uruguay, or 6 hours landing at Gualeguaychú. The flight has been approved by ANAC/EANA.

Flight forecast: <http://lu7aa.org/pronostico.asp?callsign=LU7AA-12>

An attempt will also be made to launch LU8YY PicoBalloon emitting WSPR at 20m, if the winds help it could go around the world.

In Merlo, from May 24 to 26, presentations will be made to schools and universities. Depending on the weather it could be launched on May 25.

This experience will provide 4 FM channels + 3 CW + 3 SSB + 1 digital channel and 1 SSTV, all simultaneous. It will allow field testing on a balloon the future satellite platforms planned by AMSAT Argentina.

For latest updates check <http://amsat.org.ar/?f=merlo>.

Kudos to AMSAT Argentina for this project! A *transponder* payload on a balloon is *seriously* Zero Retries Interesting! I just haven't seen any explanations of how to build such a transponder; it would seem like this should be something that's doable in software within a Software Defined Radio system. Amateur Radio hasn't done nearly enough experimentation with *terrestrial* transponders like this great experiment, and I think we should be doing a lot more of that now that software defined transceivers are becoming more accessible to Amateur Radio Operators.

Random Wire Review 91: May 24, 2024 - An All Zero Retries Interesting Issue!

Tom Salzer KJ7T put out a blockbuster issue of his Random Wire Review newsletter in Issue 91. Every bit of it was Zero Retries Interesting, and merited at least a 3x re-read to really grok all the cool stuff he discussed. I particularly enjoyed the discussion of the (new to me) FreedomLINK radios. KJ7T also said:

Personal note: As I review some past issues of the Random Wire, I am recognizing something I had not really verbalized before: **if it has to do with radio, I'm all in!** Amateur radio is my hobby of choice but I like radio in all of its manifestations. It doesn't have to be something within my amateur radio license to be interesting.

QSL, KJ7T... ***QSL!*** I too *like radio in all its manifestations*, and that's an elegant "elevator pitch" to explain our common curiosity about all kinds of radio technology.

New official [JNOS] 2.0p, IPV6, APRS, VARA, and important AT loop fix

Maiko Langelaar VE4KLM on the NOS-BBS mailing list:

Good day,

In case anyone missed it, there is a new official version - JNOS 2.0p.

Don't feel you need to switch over, I can just see (not) the miles of cars lined up.

BUT there is an important fix to an 'AT' loop issue that can lockup JNOS really good.

The issue has actually been around since the early JNOS 1.11f days (or before), so you might want to take a look at, the new code is in the development repository.

For anyone asking for 'features' or 'fixes', I am not ignoring you, really I'm not.

It's all on my todo list, but 'life' is just in the way right now - called priorities :!

Maiko / VE4KLM

<http://www.langelaar.net>

My thanks for Bill Vodall W7NWP for mentioning this on another email list that we're both on. I'd completely forgotten about the NOS-BBS mailing list, and have now (attempted to) resubscribed.

Leave a comment

Share

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything*!
- **Founding Members who generously support Zero Retries financially:**
 - Founding Member 0000 - Steven Davidson K3FZT
 - Founding Member 0001 - Prefers to Remain Anonymous 01
 - Founding Member 0002 - Chris Osburn KD7DVD
 - Founding Member 0003 - Don Rotolo N2IRZ
 - Founding Member 0004 - William Arcand W1WRA
 - Founding Member 0005 - Ben Kuhn KU0HN

Founding Member 0006 - Todd Willey KQ4FID
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- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

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- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.
- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your [QRZ](#) page (or other web presence) and include a link:

<https://www.zeroretries.org>

- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR:
Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- [Dan Romanchik KB6NU](#) mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Jeff Davis KE9V](#) also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.
- [Amateur Radio Weekly](#) by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.
- [Experimental Radio News](#) by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!
- [RTL-SDR Blog](#) - *Excellent* coverage of Software Defined Radio units.
- [TAPR Packet Status Register](#) has been published continuously since 1982.
- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- [HB9BLA Wireless](#) by Andreas Spiess HB9BLA
- [KM6LYW Radio](#) by Craig Lamparter KM6LYW (home of the [DigiPi project](#))
- [Modern Ham](#) by Billy Penley KN4MKB

- [Tech Minds](#) by Matthew Miller M0DQW

Zero Retries is currently using the [Substack email publishing platform](#) to publish Zero Retries. It's particularly suitable for small newsletters as you can get started for no cost.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join **1700+** other subscribers:

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Social Media:

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

[Zero Retries / N8GNJ on Mastodon](#)

Zero Retries (N8GNJ) is also on Bluesky — [@n8gnj](#) — just click:

[Zero Retries / N8GNJ on Bluesky](#)

Email issues of Zero Retries are “instrumented” by [Substack](#) to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham ([The City of Subdued Excitement](#)), Washington, USA, and linked to the Internet via [Starlink Satellite Internet Access](#).

2024-05-24

Blanket permission is granted for TAPR to use any Steve Stroh content in Zero Retries for the TAPR Packet Status Register (PSR) newsletter (I owe them from way back).

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[1](#)

It's a longer term discussion, worthy of an (eventual) dedicated issue of Zero Retries, but I've recently come to the conclusion that M17 is complete (enough) and "ready to go" to be a capable digital voice... *and messaging / data...* system for Amateur Radio. There are some issues, including establishing recognition that M17 *is usable now*, getting it *adequately documented*, and of course, having at least a few ready-to-use radios with M17 built-in available. But the largest issue with M17 is the momentum, and the sunk costs, of existing single-mode DMR, D-Star, SF repeaters, radios owned by individuals, and Internet interconnection networks. It will take some serious evangelism to get folks to understand the advantages of M17.

[2](#)

In "prognosticating" about D-Star, *I miss John Hays K7VE more than ever*. John had an invaluable, independent, in-depth perspective on D-Star, which didn't interfere with his advocacy of D-Star. If he were still with us, I would have solicited and incorporated his thoughts on this issue. You are too soon gone, John - Rest in Peace.

[3](#)

Despite all the issues with Amateur Radio use of DMR (such as no callsigns being transmitted digitally), data being implemented poorly, etc.